

ADVANCED SUBSIDIARY GCE

APPLIED SCIENCE

Unit 4: Cells and Molecules

PLAN FOR AN INVESTIGATION

INSERT

G623/INSERT

For issue on or after: **MONDAY 17 NOVEMBER 2008**



INSTRUCTIONS TO CANDIDATES

- The abstracts on page 2 of this insert are to give you some background that you might find helpful in planning for the task that follows. Not all the information included will be directly relevant and you are expected to select the information which is relevant to the task.

INFORMATION FOR CANDIDATES

- This document consists of 2 pages. Any blank pages are indicated.

Abstract 1: Barley straw as an inhibitor of algal growth I: studies in the Chesterfield Canal.
I. M. Welch, P. R. F. Barrett, M. T. Gibson and I. Ridge
Journal of Applied Phycology
Vol. 2 Number 3. September 1990

The presence of rotting barley straw in a disused canal reduced the amount of filamentous algae. No effect was observed during the first season after the introduction of straw but algae were decreased in three subsequent years. Algal

Abstract 2: The effects of barley straw (*Hordeum vulgare*) on the growth of freshwater algae.
M. D. Ferrier, B. R. Butler, D. E. Terlizzi and R. V. Lacouture.
Bioresource Technology
Volume 96, Issue 16, November 2005

Bioassays were conducted to determine the efficacy of barley straw liquor in controlling algal growth of 12 freshwater species of algae. Barley straw liquor inhibited the growth of three nuisance algae common in freshwater: *Synura petersenii*, *Dinobryon* sp., and *Microcystis aeruginosa*. However, *Selenastrum capricornutum*, *Spirogyra* sp., *Oscillatoria lutea* var. *contorta*, and *Navicula* sp., had significantly increased growth in the presence of straw liquor. The growth of the remainder, *Ulothrix fimbriata*, *Scenedesmus quadricauda*, *Chlorella vulgaris*, *Anabaena flos-aquae*, and *Synedra* sp. showed no significant difference from controls.
In a related field study

Abstract 3: Information Sheet 1: Control of algae with Barley straw.
Centre for Ecology and Hydrology
Centre for Aquatic Plant Management
Wallingford, Oxon, OX10 8BB www.capm.org.uk

... to provide practical advice on the optimum ways of using straw.

HOW STRAW WORKS

In order to use straw effectively, it is necessary to understand something of how the process works. When barley straw is put into water, it starts to decompose and during this process chemicals are released which inhibit the growth of algae. Rotting is a microbial process and is temperature dependent, being faster in summer than in winter. It may take 6–8 weeks for straw to become active when water temperatures are below 10 °C but only 1–2 weeks when water is above 20 °C. During this period, algal growth will continue unchecked. Once the straw has started to release the chemical it will remain active until it has almost completely decomposed. The duration



Copyright Acknowledgements:

Abstract 1 I.M. Welch et al, Barley straw as an inhibitor of algal growth I: studies in the Chesterfield Canal, Journal of Applied Phycology, Vol. 2 Issue 3, September 1990, www.springer.com
Abstract 2 This abstract was published in Bioresource Technology, Vol. 96 Issue 16, Author(s), MD Ferrier et al, The effects of barley straw (*Hordeum vulgare*) on the growth of freshwater algae, Copyright Elsevier (November 2005)
Abstract 3 Information Sheet 1: Control of algae with Barley straw, © NERC - Centre for Ecology and Hydrology.

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